National Aeronautics and Space Administration

Living and Working in Space: Habitat

Assessment Rubric: Air and Water

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Guide Questions: How can humans maintain sufficient clean water and breathable air? What modifications are necessary for an extended space missions?

Task to be assessed: Students will design a system to maintain clean water and breathable air in a habitat for six researchers on the Moon or Mars and explain why it should be successful.

Knowledge Areas

	Exemplary	Proficient	Developing	Novice
Understanding of how clean air and water are maintained naturally within Earth's ecosystems	Design includes accurate information of how ecosystems recycle water and air on Earth. Presentation describes differences and similarities between designed system and Earth. Presentation includes explanation of carbon cycle and water cycle.	Design includes accurate information of how air and water are recycled on Earth. Presentation describes how design is similar to Earth system.	Design focuses on technological methods for cleaning water and air, such as sewage treatment plants.	Student believes that clean air and water are always available on Earth. OR Student believes that once air or water is used it disappears or is discarded.
Understanding of current technology	Design includes accurate information about current technology for recycling wastes and regenerating oxygen and pure water. Connection of technology to human requirements is clearly made. The role of technology is clearly explained. Technology is used appropriately.	Design includes accurate information of current technology for recycling wastes and regenerating oxygen and pure water. The technology is accurately described.	Design focuses on removing harmful wastes from air and water.	Design depends on re-supply of air and water from Earth. OR Any technology that is used is modeled after sewage treatment plants.

Assessment Rubric **Air and Water** (continued)				
Knowledge Areas (continued)				
	Exemplary	**Proficient**	**Developing**	**Novice**
Understanding of resources and challenges on the Moon or Mars	Design includes accurate information about the resources and challenges to recycling wastes and regenerating oxygen and pure water on the Moon or Mars. Choice of location is explained. Attempt is made to quantify resources and challenges in comparison with Earth.	Design uses local resources and technology to solve the challenges to recycling wastes and regenerating oxygen and pure water on the Moon or Mars. Presentation describes how challenges are met.	Design is modeled after systems on the ISS or sewage treatment on Earth. Presentation describes challenges of removing harmful wastes from air and water on the Moon or Mars.	Design is based on the assumption that Mars is very similar to Earth, but hotter (or colder), and the resources will be the same. OR Design includes constant re-supply of oxygen and water.
Integration of Knowledge	Design takes into account the elements for a healthy ecosystem on Earth, current technology, and modifications necessary for the Moon or Mars. Presentation describes the inter-relatedness of all knowledge areas clearly and accurately.	Design takes into account the way Earth ecosystems purify air and water, current technology, and modifications necessary for the Moon or Mars.	Design takes into account more than one knowledge area, and one dominates.	Design tends to focus on one knowledge area, assuming the Moon or Mars will not be different from Earth.
Construction of Design Model	The model represents all of the elements of the design clearly and accurately. Functionally appropriate materials are chosen and used creatively. The model is attractive and informative.	The model represents all of the elements of the design. The materials are functionally appropriate and add to the understanding of the design.	The model represents the functionally critical elements of the design. Functionally appropriate materials are used.	The model focuses on the aspects that stand out or are of interest to the builder. Materials are chosen for attractiveness or availability.

Assessment Rubric **Air and Water** (continued)				
	Exemplary	**Proficient**	**Developing**	**Novice**
Effectiveness of Presentation	Presentation was clear, accurate, well organized, and interesting. Visual aids were accurate, attractive and important to the presentation. A focus of the presentation was the audience understanding the plan and the reasons to expect success at chosen location.	Student presentation organized ideas in a logical or creative way. Visual aids were used to highlight the ideas. A focus of the presentation was the audience understanding of the diet and exercise plan.	Student presentation was clear and organized. Visual aids were used.	Student presented ideas as they came to mind.